



COMMONWEALTH OF MASSACHUSETTS  
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS  
DEPARTMENT OF ENVIRONMENTAL PROTECTION  
ONE WINTER STREET, BOSTON, MA 02108 617-292-5500

MITT ROMNEY  
Governor

KERRY HEALEY  
Lieutenant Governor

ROBERT W. GOLLEDGE, Jr.  
Secretary

ARLEEN O'DONNELL  
Commissioner

## Memorandum

To: Fireworks Contractors and Interested Parties

From: Janine Commerford, Assistant Commissioner – Bureau of Waste Site Cleanup  
Massachusetts Department of Environmental Protection

Subject: Potential Environmental Contamination From the Use of Perchlorate-Containing Fireworks

Date: December 5, 2006

## Introduction

The Massachusetts Department of Environmental Protection (MassDEP) has detected perchlorate in nine drinking water supplies in Massachusetts, including three public water supply wells where nearby fireworks displays appear to be a source of the perchlorate contamination. The purpose of this memorandum is to provide guidance on perchlorate-containing fireworks to prevent contamination of drinking water supplies from this potential source.

## Background

Perchlorate is a chemical compound comprised of 1-chlorine and 4-oxygen atoms. Perchlorate is used as a solid rocket propellant, and is also found in a number of common products, including airbag inflators, industrial chemicals, explosives, and fireworks. Perchlorate is highly water soluble, and can travel significant distances in groundwater. Perchlorate can affect the function of the thyroid gland, which regulates the body's metabolism. Pregnant women and their fetuses, infants, children under the age of 12, and people with hypothyroidism are most susceptible. MassDEP promulgated in August 2006 a Maximum Contaminant Level (MCL) of 2 µg/l under the state drinking water regulations, 310 CMR 22, and notification criteria (Reportable Concentrations in soil and groundwater) for this contaminant under the state waste site cleanup regulations (Massachusetts Contingency Plan, 310 CMR 40.0000).

In response to detection of perchlorate in water supply wells in Massachusetts, MassDEP is investigating surrounding sites and activities that may have caused or contributed to contamination. Fireworks displays employing perchlorate-containing pyrotechnics have been identified in at least three locations as the possible source of drinking water contamination.

## Recommendations

MassDEP believes it is prudent for fireworks contractors to take the following reasonable steps to minimize environmental contamination:

1. Request low (or no) perchlorate containing fireworks. This may require that you make inquiries with your suppliers and/or manufacturers.
2. Institute rigorous "housekeeping" practices. It appears that the deposition of unburned aerial shell fragments and other pyrotechnic debris may be the primary mechanism by which groundwater becomes contaminated by perchlorate. Fireworks companies or display sponsors should remove all visible shell debris encountered during the search at first light.
3. Dispose or manage "duds" and "misfires" appropriately; all "duds" or "misfires" must be removed from the site and disposed of in accordance with applicable codes and manufacturer's instructions. Contain and/or promptly address runoff in cases where water is used to douse duds or misfired materials.
4. Be aware of the existence of surrounding drinking water supplies and stay as far away from them as possible. Of particular concern are fireworks displays within the recharge areas of public drinking water supply wells (i.e., "Zone II" and "Interim Wellhead Protection" areas). Maps of these areas and surface water supplies should be available from local officials, and can be viewed on-line at <http://www.mass.gov/mgis/> (specifically <http://maps.massgis.state.ma.us/WSPA/viewer.htm>) and <http://mass.gov/dep/water/drinking/swapreps.htm>

Please contact Rose Knox at the MassDEP Bureau of Waste Site Cleanup (BWSC) at 617-556-1026 or [Rosemary.Knox@state.ma.us](mailto:Rosemary.Knox@state.ma.us) if you would like additional information, or please refer to the following link on MassDEP's Website: <http://mass.gov/dep/water/drinking/percinfo.htm>